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\$3 per day, American plan. Persons wishing to join this party should send their names to Dr. I. C. White, Morgantown, W. Va., without delay. During the Association meeting some shorter excursions are proposed, under the direction of Mr. James R. Macfarlane. When the details of the several excursions are perfected, a special circular relating to them will be issued.

The Hotel Schenley has been selected by the local committee, A. A. A. S., as the headquarters.

All persons attending the meetings in conjunction with the A. A. A. S. can secure the customary reduction in railway rates, to one and one third fare for the round trip, by obtaining a certificate at the starting point in the name of the Association. Tickets may be bought from June 19 to June 30.

HERMAN LE ROY FAIRCHILD,
Secretary.

ROCHESTER, N. Y.,
May 15, 1902.

SOCIAL AND ECONOMIC SCIENCE AT THE PITTSBURGH MEETING OF THE AMERICAN ASSOCIATION.

THE next meeting of the American Association for the Advancement of Science will be held at Pittsburgh from June 30 to July 3, 1902. The easily accessible location of the place of meeting, combined with its peculiar economic interest as a great industrial center, offers the opportunity to Section I for an exceptionally successful session. To make it such the hearty cooperation of all members of the Section is needed. They are cordially invited to attend the sessions and to contribute papers to the proceedings. They should inform the secretary as promptly as possible of the title and the probable length of any paper that they may care to present, so that notice of it may appear in the preliminary program.

CARROLL D. WRIGHT,
Chairman.
FRANK R. RUTTER,
Secretary.

DEPARTMENT OF AGRICULTURE,
WASHINGTON, May 2, 1902.

SHORTER ARTICLES.

STREPTOCOCCI CHARACTERISTIC OF SEWAGE AND
SEWAGE-POLLUTED WATERS APPARENTLY
NOT HITHERTO REPORTED IN AMERICA.*

DURING the last few years the brilliant researches of the bacteriologists connected with the Local Government Board of England have revealed two new organisms which, with the *Bacillus coli communis*, are likely to be of great service in tracing the history of water pollution. These are the *Bacillus enteritidis sporogenes* of Klein, and the sewage *Streptococcus* of Houston; so that now with three forms, all apparently characteristic of a sewage flora, the sanitary bacteriologist finds himself in a position to form a reliable opinion of the antecedents of any water submitted to him for examination.

The importance of the streptococci to the sanitarian was first pointed out by Dr. A. C. Houston in an article entitled, 'Bacterioscopic Examination of Drinking Water, with Particular Reference to the Relations of Streptococci and Staphylococci with Waters of this Class,' published in the Report of the Medical Officer to the Local Government Board for 1898-9 (Supplement, XXVIII. Ann. Rep., L. G. B.). He there stated that he had isolated both streptococci and staphylococci from polluted soils, from crude sewage, from sewage effluents and from impure waters; but he laid stress mainly upon organisms of the former class, as germs unlikely to persist for a long period outside the animal body, and therefore indicative of fresh pollution. He concluded by stating that the streptococci 'are organisms readily demonstrable in waters recently polluted and seemingly altogether absent from waters above suspicion of contamination. * * * Search for them should * * * constitute an important part of bacterioscopic analysis of potable waters.' In the report of the Medical Officer of the Local Government Board for 1899-1900 Dr. Houston extended his investigations to the study of a large number of additional samples of polluted waters and soils, with the result that the presence of the streptococci seemed always to coincide with

* Preliminary communication.

'animal pollution of extremely recent, and therefore specially dangerous, kind.' Professor W. H. Horrocks in his excellent 'Bacteriological Examination of Water' (London, 1901) devotes a short chapter to the importance of this group of microorganisms. In his own experiments he finds, just as Houston has done, that the streptococci are typical sewage forms, although he differs from that author as to their relation to strictly recent contamination.

Strangely enough these investigations appear thus far to have attracted little attention outside of England. Neither in America, nor on the continent, as far as we are aware, have the streptococci been reported as characteristic of sewage. Indeed Jordan in his classic report on the bacteria of sewage ('Special Report of the Mass. S. B. H. on the Purification of Sewage and Water, 1890') concluded that, 'a striking and highly remarkable circumstance is the comparative absence of micrococci, or spherical bacteria, from the sewage and effluents.' Probably his failure to detect these organisms may be explained by the fact that they grow slowly and uncertainly in media not containing sugars.

We first isolated the sewage streptococci of Houston in the spring of 1901, in a study of the bacteria occurring on the hands, chiefly of students and school children, where they were found in two out of some hundred specimens of wash-water examined—in both cases in conjunction with the *Bacillus coli*—but their importance was not recognized at this time. Later, we found the same organisms in Boston sewage and in fresh faeces where they appear often to be the most abundant forms present. They have also been isolated in considerable numbers from a septic tank by Mr. D. M. Belcher, a student working in the same laboratory as ourselves.

The occurrence of streptococci in polluted river water seems to be constant and significant. During March and April of 1902 we examined forty-eight different samples of water derived from the Charles River between Boston and Cambridge, the Mystic River between Charlestown and Everett, the North River at Salem and the Neponset River at Hyde Park. The examinations were made by

inoculating dextrose-broth with one cubic centimeter of the water, plating in litmus-lactose agar twenty-four hours after, and studying the reactions of pure cultures obtained from the plates, in dextrose-broth, milk, nitrate solution, peptone and gelatin. As a rule the preliminary dextrose tubes contained, after twenty-four hours, practically a pure culture of some organism which had overgrown all other forms. In twenty-two of the forty-eight samples, the colonies on the litmus-lactose agar plates proved to be colon bacilli, or allied forms, and in one case a liquefier, resembling Jordan's *Bacillus cloacæ*. From the remaining twenty-five samples, cultures were obtained which gave all of the reactions of Houston's streptococcus as noted below, the growths on agar and gelatin and the rapid formation of acid from sugars being very characteristic. Stained preparations made from agar cultures showed short chains of streptococci mingled with irregular plate-like masses. In every sample of water examined, gas was formed in the preliminary dextrose tube, so that as the pure cultures later isolated on the lactose-agar plate gave no gas, it was evident that *Bacillus coli* or some other gas-forming organism must have multiplied at first and then have been overgrown.

Both Houston and Horrocks have published descriptions of a large number of streptococci isolated by them from sewage, designated by a complex series of letters and figures. It does not appear, however, that the differences recorded indicate anything more than slight variations from one main type. Most of the organisms described are streptococci, developing rapidly at 37°, growing rather better under anaerobic than aerobic conditions, producing a faint dotted growth of small, thin round colonies on agar, a beaded growth in the depth of the gelatin stab, and a strong acid reaction in milk. We have found a second type, apparently not noticed by the English observers, which has all of these characteristics, but liquefies gelatin, which the commoner streptococcus does not. Organisms of both types, as observed by us, fail to reduce nitrates or to form indol, and both produce acidity, but no gas, in the dextrose

tube. The commoner, non-liquefying form appears to have been found by Laws and Andrewes in the sewage of St. Bartholomew's Hospital in 1894 (Report to the London County Council on the 'Micro-organisms of Sewage'). Still earlier Roscoe and Lunt ('Contributions to the Chemical Bacteriology of Sewage,' *Phil. Trans. Roy. Soc. London*, CLXXXII., 1891, not CLXXXIII., 1892, as given by Chester) described under the name *Streptococcus mirabilis* a form which developed best without air, gave faint growths on gelatin and agar, and formed a cottony mass at the bottom of the broth tube. These organisms are all closely related to each other, as well as to the *Streptococcus pyogenes* of Rosenbach; and until more detailed systematic study of the group is made, the common sewage forms may perhaps best be known provisionally as the 'sewage streptococci of Houston,' since he first called attention to their sanitary significance. We feel convinced that this group may prove of the greatest assistance to bacteriologists in this country, as it has done already in England, and that record of its presence or absence should be made in any sanitary bacteriological water analysis.

C.-E. A. WINSLOW.

(MISS) M. P. HUNNEWELL.

BIOLOGICAL LABORATORIES,

MASS. INSTITUTE OF TECHNOLOGY,

May 8, 1902.

THE METRIC SYSTEM OF WEIGHTS AND MEASURES.*

THE Committee on Coinage, Weights, and Measures, to whom was referred the bill to adopt the weights and measures of the metric system as the standard weights and measures of the United States, having duly considered the same, respectfully report as follows:

* Report submitted by Mr. Southard, from the Committee on Coinage, Weights, and Measures, to the House of Representatives on April 21. The text of the bill recommended is as follows: *Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That on and after the first day of January, nineteen hundred and four, all the departments of the Government of the United

By Section VIII. of Article I. of the Constitution power is vested in Congress to fix the standard of weights and measures, and yet, strange as it may appear, this is about the only great and important subject intrusted to its care by the express provisions of the Constitution which has been almost wholly neglected. Again and again has the necessity for a change in our system of weights and measures been urged upon the attention of Congress. Washington more than once pointed out the importance of securing a uniform system of weights and measures, and early in the history of our country the matter was referred to Jefferson, then Secretary of State, who proposed two plans, one an adaptation of the existing system and the other a strictly decimal system.

John Quincy Adams, as Secretary of State, after four years of careful study, made a report which is worthy of the attention of the most advanced thinkers upon this subject at the present day. He pointed out the failure of the English people to reduce to any sensible order the chaos of their weights and measures and urged upon Congress the necessity for a reform. He, however, advised delay until the metric or international system, which was then in its infancy, had been more fully tried, and to which he referred in a most glowing tribute as possessing all of the requisites of a simple, uniform, and workable system of weights and measures.

Since that time the adoption of the metric system has been repeatedly recommended by the departments of the Government and Congressional committees. The annual report of the Secretary of the Treasury for the year ending June 30, 1899, contains the following clear and concise statement:

States, in the transaction of all business requiring the use of weight and measurement, except in completing the survey of public lands, shall employ and use only the weights and measures of the metric system; and on and after the first day of January, nineteen hundred and seven, the weights and measures of the metric system shall be the legal standard weights and measures of and in the United States.